Earth Science Data Systems Reuse Working Group Year-end Report, 2005

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Activities during 2005 included recommendations to NASA HQ to encourage and enable software reuse, establishment of a web-based portal, and a survey and trade study. These efforts are related to one another, and their success has been due in part to our interactions with other working groups through joint meetings. Throughout the year we have held monthly telecons, supplemented with weekly support group telecons.

Recommendations to Headquarters. We made the following policy recommendations: NASA should develop standard language for use in future procurement and grant notices that will encourage more software reuse, and should adopt a policy of releasing its Earth science software to the community using the NASA Open Source Agreement. We also made the following recommendations to enable reuse systems: NASA should establish a Web-based information portal for the sharing and dissemination of information about software reuse practices for the Earth science community, and should establish a system to facilitate the cataloguing and distribution of reusable assets for the Earth science community.

NASA HQ's response included: that nascent language developed for the REASoN CANs and draft system software policy be a starting point, that the Data Systems Program Executive will work with NASA Legal to finalize appropriate language, that appropriate language will be included in ROSES (Earth Science) announcements, and that Open Source be considered as one of a number of solutions to achieve effective lifecycle costs and appropriate design or that NASA may opt to assign copyright to NASA or its designee to foster commercial development, that the process for release software to open source should be improved. Further, NASA seeks recommendation from the Reuse WG on how to facilitate and release software for Open Source.

For enabling systems, the response included: that we encourage the continued development of the Software Reuse (http://softwarereuse.nasa.gov) web site and that we undertake a trade study to understand the roles of NASA Open Source Agreement web site (http://opensource.arc.nasa.gov), the role of GCMD in cataloguing data services, and the roles of any other related NASA software sites. However, HQ thinks that cataloguing and distribution of reusable assets for the Earth science community may be premature and needs to await the results of a trade study concerning the establishment of a reuse portal.

Trade Study and Survey. That last response prompted us to conduct a trade study and reuse survey. The first survey was conducted in mid-2004, but was limited to the ".gov" domain until OMB approval was gained in January 2005 to include a more diverse set of respondents (including outside of government). From the trade study we concluded that none of the existing sites fulfil the role of a software repository for the Earth science community, and that none of the systems provide the capabilities needed to function as a reuse enablement system. We found that typical shortcomings of existing systems included not meeting enough of the critical functional requirements, not focusing on the Earth science domain, not targeting software developers as the primary audience, and not providing the type of small-sized assets that are most desired by the community of Earth science software developers for reuse purposes. Therefore, we feel that a new catalogue/repository system is needed to encourage and better enable software reuse within the community of Earth science software developers. Some collaboration with existing systems may be possible, but existing systems alone cannot meet the needs of this community.

Policy Activities. We provided feedback to Headquarters on "Draft Policy for System Software Acquisition for NASA Data System Solicitation", and on proposed changes to NPD 2210.1B (External Release of NASA Software). We developed draft language for future grant and procurement RFPs that addresses software reuse and open source software and for possible inclusion in ROSES (Earth Science) announcements. Also, we established a liaison with the Office of Technology Transfer.

Portal. We designed, developed, and now maintain a website (http://softwarereuse.nasa.gov) for news and information on reusable assets, and links to various catalogues (e.g., GCMD, OTT Open Source), funding opportunities, and dates and contact information for upcoming events relevant to software reuse.

Other websites we established and maintain:
Collaboration Site: http://www.sciencedatasystems.org/seeds/wg/reuse/default.aspx
Mailing List: http://lists.sciencedatasystems.org/mailman/listinfo/reuse_lists.sciencedatasystems.org

Publications and Presentations during 2005:

- Downs, R. R., Giles, D. M., & Olding, S. (January 5, 2005). Earth Science Reuse Portal Prototype. Technical Poster presented by S. Olding. Fourteenth ESIP Assembly Meeting, January 4-6, 2005, Washington, DC.
- Downs, R. R., Giles, D. M., & Olding, S. (June 15 , 2005). Earth Science Reuse Portal. Poster presented by S. Olding. Fifteenth ESIP Assembly Meeting, San Diego,CA
- Gerard, R. et. al. Promoting Reuse Within the Earth Science Community. Poster Session. AGU 2005 Joint Assembly, 23–27 May 2005, New Orleans, LA.
- Wolfe, R. et. al. NASA ESDS Software Reuse WG Breakout Session. ESIP Federation 2005 Summer Meeting, 14 June 2004, San Diego, CA.
- Marshall, J. J., et al., Earth Science Software Reuse Enablement Systems. Poster Session, AGU Fall Meeting December 4-9, 2005, San Francisco, CA.
- Olding, S. W., et al., Software Reuse Practice within the Earth Science Community. Poster Session, AGU Fall Meeting December 4-9, 2005, San Francisco, CA.
- Marshall, J. et al. Earth Science Software Reuse Enablement Systems. Poster presented by J. Marshall at the Fourth NASA Earth Science Data System Working Group Joint Meeting, October 25-27, 2005, Baltimore, MD.
- Downs, R. R., Djapic, B., & Chen. R. S. Long-Term Preservation of Geospatial Data: Data Model Development. Poster presented by R. R. Downs at the Fourth NASA Earth Science Data System Working Group Joint Meeting, October 25-27, 2005, Baltimore, MD.
- Downs, R. R. ESDS Software Reuse WG: Outreach and Education Activities. Presented by R. R. Downs at the Software Reuse Breakout Session, Fourth NASA Earth Science Data System Working Group Joint Meeting, October 25-27, 2005, Baltimore, MD.
- Downs, R. R., Gerard, R., Marshall, J., & Olding, S. (October 26, 2005). Reuse Portal Content Dissemination: Identifying Categories, Selection Criteria, Appraisal Process, and Description Specifications. Presented by R. R. Downs at the Software Reuse Breakout Session, Fourth NASA Earth Science Data System Working Group Joint Meeting, Baltimore, MD.
- Falke, Stefan. Services for Helping the Air-quality Community use ESE Data (SHAirED), presented at the ESIP Federation 2005 Summer Meeting, 14 June 2004, San Diego, CA.
- Jasmin, Thomas. Satellite Observations in Science Education (SOSE), presented at the ESIP Federation 2005 Summer Meeting, 14 June 2004, San Diego, CA.
- Teng, William. Simple, Scalable, Script-based Science Processor for Measurements (S4PM), presented at the ESIP Federation 2005 Summer Meeting, 14 June 2004, San Diego, CA.
- Swick, Ross. JAVA Search and Order Interface for V0 (Version Zero) Datasets, presented at the ESIP Federation 2005 Summer Meeting, 14 June 2004, San Diego, CA.

2006 Tasks for Enablement and Policy:

- *Reuse enablement system:* Submit trade study and get HQ's feedback.
- *Reuse portal:* Provide more content and keep up to date; promote portal to community.
- *Metrics/measurements ;* Generate/analyze statistics for portal web site.
- *Promote reuse:* Continue publications in journals and presentations at conferences; continue analysis of survey and publish results; hold special session at the AGU fall meeting; continue working with HQ on follow-up to previous recommendations; continue working with Office of Technology Transfer to facilitate software release process; provide expertise where needed on ideas for incentives for reuse.

2006 WG Partnerships. Focus on areas of cooperation and collaboration with other WGs, use Technology Infusion capability vision/roadmap as a framework, engage Interoperable Information (Web) Services, help with metadata definition, identify reusable assets for categories of web services components, HDF product content standards, identify reusable assets for implementing a possible standard.

2006 Outreach and Education Strategy. We plan to identify outreach and education activities for each audience segment, explore communication opportunities for each activity and audience, prioritize activities to optimize capabilities and interests of team, and develop and identify resources to foster reuse awareness and understanding. Further, we plan to submit articles to ESE journals, magazines, and bulletins, post Reuse WG announcements on list-servers and newsletters, establish community collaboration forums for sharing reuse experiences, and utilize the portal to disseminate outreach and education resources on reuse.

FY06 Challenges. We recognize the need to involve more participants (get more participants to make contributions), identify and reach out to decision makers at NASA Centers, and adjust to NASA's dynamic organizational structure.